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| **Lesson Title: Toy Car Lab** |
| **Subject area / course / grade level: 4th Grade Math** |
| **Introduction: This lesson is designed to have students explore the scientific method of developing an experiment, as well as collecting and analyzing data. Lesson will also cover measurement and conversions of units. Students will cover a variety of math and science standards in this lesson.** |
| **Lesson Length: 2 60 minute class periods.** |
| **Materials: Toy cars, graph paper, white paper, meter sticks, large white boards, sidewalk chalk.** |
| **Lesson Overview:**  **In this lesson, students will measure the distance that their toy car goes in 15 second increments. They will mark each measurement on the pavement outside with sidewalk chalk, then at the end of the allotted time, they will measure the distances between the marks with meter sticks. Toy cars will travel at different rates, due to modified batteries. Students will work cooperatively to create a graph to share their data. Each student will create their own graph, then one group graph on the large white board. Data will be shared with class and trends will be observed. Students will work together to hypothesize why the cars traveled at different rates.** |
| **Tennessee Standards:**  **GLE 0507. Inq. 2. Select and use appropriate tools and simple equipment to conduct an investigation.**  **GLE 0507. Inq.3. Organize data into appropriate tables, graphs, drawings, or diagrams.**  **0507. Inq. 2. Identify tools needed to investigate specific questions.**  **0507. Inq. 3. Maintain a science notebook that includes observations, data, diagrams, and explanations.**  **0507. Inq. 4. Analyze and communicate findings from multiple investigations of similar phenomena to reach a conclusion.**  **GLE.0507.11.1 Design an investigation, collect data and draw conclusions about the relationship among mass, force, and distance traveled.** |
| **Lesson objective(s):**  **-The students will track and record measurements of a toy car on 15 second increments.**  **- The students will measure various distances using meter sticks.**  **-The students will convert measurements from centimeters to meters.**  **-The students will create a graph based upon data collected.** |
| **ENGAGEMENT**   * **Students have been told that they will be measuring the distance a car will travel. They know that the cars will have differences, but they have not been told what the differences may be. They will hypothesize how far their car will go after a 15 second measurement.** * **Questions:**   **1) How does the motion of the two cars differ?**  **2) Is the speed of the cars changing or staying the same?**  **3) How would we record our data?** |
| **EXPLORATION**   * **Students will be placed into small groups, of no more than 4 students. They will have stopwatches and sidewalk chalk to start. At every 15 second mark, the students will use the sidewalk chalk to mark where the car had traveled. Once all marks have been made, student s will return to their marks and measure the distance. Students will record data on their data sheet, as they measure. Students share their data with the other groups, and make observations about each other’s results.** |
| **EXPLANATION**   * **Students will create a graph to display their results individually, then working with their original small group they will create a graph on a large whiteboard. White boards will be presented to the class by the small groups.** * **Questioning:** * **What trends do you notice?** * **Is your data the same as the other groups?** * **Are there any differences in the graphs?** * **What do you think is causing the difference in speed?** |
| **ELABORATION**   * **Students will review academic vocabulary related to the lesson.** * **Each group will create an online graph using onlinecharttool.com** |
| **EVALUATION**   * **Students will keep their data collection and graphing activity to answer the following questions:** * **Using the formula for speed (distance/time), how fast does your car move?** * **Describe the way in which your toy car moves.** * **How are the fast moving car graphs different than the slow moving car graphs?** |